CLAIMS

1. A linear actuator, wherein a plurality of electromagnets where coils are wound around magnetic materials are provided so as to face each other in a manner where the polarities N and S of said electromagnets alternate at the time of excitation, and magnetic poles of a plurality of permanent magnets that are aligned so as to form a movable member are placed in positions that face the plurality of magnetic poles, wherein

said permanent magnets extend beyond the portions where said magnetic poles of said electromagnets are provided so as to face.

2. The linear actuator according to Claim 1, wherein

a notch is formed on a portion in the direction of the axis of said magnetic poles of said electromagnets that face said magnetic poles of said permanent magnets, so that a magnetic flux is formed so as to pass said permanent magnets in the portions other than those where said magnetic poles of said electromagnets and said magnetic poles of said permanent magnets face each other.

3. The linear actuator according to Claim 2, wherein

three permanent magnets are aligned between said magnetic poles of said adjacent electromagnets.

4. The linear actuator according to Claim 3, wherein

said magnetic poles of one permanent magnet are placed so as to span said magnetic poles of said adjacent electromagnets at the time of full stroke.

5. A linear actuator, wherein

magnetic poles of a plurality of electromagnets where coils are wound around magnetic materials are aligned in a manner where the polarities N and S alternate at the time of excitation, and magnetic poles of permanent magnets of which the number is smaller than the number of magnetic poles of said electromagnets by 1 are aligned in positions that face said magnetic poles of said electromagnets,

magnetic gaps are provided between said respective magnetic poles of said electromagnets on the side that faces the permanent magnets, and

the magnetic poles of said permanent magnets are arranged so that one magnetic pole of said permanent magnets spans between said respective magnetic poles of said

electromagnets at the time of full stroke.

6. The linear actuator according to Claim 5, wherein permanent magnets of which the magnetic poles are opposite that of adjacent permanent magnets are placed in positions adjacent to said permanent magnets, in a position that faces an end magnetic pole in the direction of the axis of the lane of the magnetic poles of said electromagnets on the side that faces said permanent magnets, and at least a portion of said permanent magnets extends to the outside of the end portion of the lane of the magnetic poles of said electromagnets at the time of full stroke.

7. The linear actuator according to Claim 6, wherein a notch is provided at the center of said magnetic poles of said electromagnets on the side that faces said permanent magnets, so that a magnetic gap is provided.

8. The linear actuator according to Claim 7, wherein a magnetic gap is provided between said adjacent permanent magnets.

9. The linear actuator according to Claim 8, wherein

magnetic materials are placed between said respective magnetic poles of said electromagnets on the side that does not face said permanent magnets, so that a magnetic circuit which connects said respective magnetic poles is provided.

10. The linear actuator according to Claim 9, wherein a support member is provided on the outer surface of said permanent magnets, so as to fix said permanent magnets.

11. The linear actuator according to Claim 10, wherein said support member is formed of a magnetic material, so that the density of the magnetic flux between said permanent magnets and said electromagnets is increased.

12. The linear actuator according to Claim 5, wherein said linear actuator is applied as an actuator for a pressure wave generator.